FORM PTO-1390 (REV 5-93) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER
951/49164

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U S APPLICATION NO (if known, see 37 CFR 1 5)
09/623897

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/01172	23 February 1999 (23-02-00)	10 March 1998 (10-03-1998)

TITLE OF INVENTION
DATA BUS FOR A PLURALITY OF NODES

APPLICANT(S) FOR DO/EO/US Martin PELLER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371

3. [ ] This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2)).

   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).

   b. [ ] has been transmitted by the International Bureau

   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US)

6. [X] A translation of the International Application into English (35 U S.C. 371(c)(2)).

7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))

   a [ ] are transmitted herewith (required only if not transmitted by the International Bureau).

   b. [ ] have been transmitted by the International Bureau.

   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.

   d. [ ] have not been made and will not be made.

8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3))

9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (EXECUTED)

10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Item 11. to 16. below concern other document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3 28 and 3.31 is included.

13. [X] A FIRST preliminary amendment.

    [ ] A SECOND or SUBSEQUENT preliminary amendment.

14. [X] A substitute specification.

15. [ ] A change of power of attorney and/or address letter.

16. [X] Other items or information:

a. International Search Report
b. 2 Sheets of Drawings showing Figures 1-2
c. First Page of Published Application

533 Rec'd PCT/PTO 11 SEP 2000

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/623897	INTERNATIONAL APPLICATION NO PCT/EP99/01172	ATTORNEY'S DOCKET NUMBER 951/49164	
17. [X] The following fees are submitted:		CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):			
Search Report has been prepared by the EPO or JPO ..... $840.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... $670.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482)		840.00	
but international search fee paid to USPTO (37 CFR 1.445(a)(2) ..... $760.00 Neither international preliminary examination fee (37 CFR 1.482) nor			
international search fee (37CFR 1.445(a)(2) paid to USPTO ..... $ 970.00 International preliminary examination fee paid to USPTO (37 CFR 1 482)			
and all claims satisfied provisions of PCT Article 33(2)-(4) $96.00			
ENTER APPROPRIATE BASIC FEE AMOUNT =		$840.00	
Surcharge of $130.00 for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).			

Claims	Number Filed	Number Extra	Rate		
Total Claims	4-20=	0	X $18.00	$	
Independent Claims	2-3=	0	X $78.00	$	
Multiple dependent claims(s) (if applicable)			+ $260 00	$	
TOTAL OF ABOVE CALCULATIONS =				$840.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$	
SUBTOTAL =				$840 00	
Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$840.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28,3.31). $40.00 per property +				$40.00	
TOTAL FEE ENCLOSED =				$880.00	
				Amount to be: refunded	$
				charged	$

a. [X] Two checks in the amount of $ 840.00 for the filing fee and $40.00 for the assignment recording fee are enclosed

b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees, which may be required, or credit any overpayment to Deposit Account No. 05-1323 . A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
Evenson, McKeown, Edwards & Lenahan, P.L.L.C.
1200 G Street, N.W , Suite 700
Washington, D.C. 20005
Tel. No. (202) 628-8800
Fax No. (202) 628-8844

SIGNATURE
Vincent J. Sunderdick
NAME
29,004
REGISTRATION NUMBER
September 11, 2000
DATE

Attorney Docket: 951/49164
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: MARTIN PELLER

Serial No.: NOT YET ASSIGNED Group Art Unit: NOT YET ASSIGNED

Filed: September 11, 2000 Examiner: NOT YET ASSIGNED

Title: DATA BUS FOR A PLURALITY OF NODES

PRELIMINARY AMENDMENT

Box PCT Application
Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination please amend the above-identified application as follows:

IN THE SPECIFICATION:

A substitute specification is submitted herewith.

IN THE CLAIMS:

Please cancel 1 and 2 and add new claims 3-6 as follows:

-- 3. A data bus arrangement for connecting a plurality of nodes to one another, said arrangement comprising:

a logic decision gate having a plurality of inputs for receiving a corresponding plurality of first electrical signals routed from said plurality of nodes wherein an output of the logical decision gate is connected in parallel to provide second electrical output signals routed to each of said plurality of nodes;

at least one opto-electrical transducer, each of said at least one opto-electrical transducer connected between one of said nodes and one of said inputs of said logic decision gate wherein the output of said logic decision gate is fed to an electrical input of each said opto-electric transducer;

a signal conditioning circuit arranged between said logical decision gate and the inputs of said nodes in order to provide a pulse shaping function for the output signal of said logical decision gate.

4. The data bus arrangement according to claim 3, wherein said signal conditioning circuit modifies the output signal of the decision gate in order to compensate for distortion generated by said opto-electric transducers.

5. A method for connecting a plurality of nodes to one another through a data bus configuration, said method comprising the steps of:

routing each of a plurality of outputs from said plurality of nodes to an input of a plurality of inputs of a logic decision gate wherein at least one of said outputted routed signals is fed through an opto-electric transducer to provide an electric signal to at least one input of said logic decision gate;

outputting a signal said logic decision gates and routing said output signal to an input of each of said plurality of nodes;

performing signal conditioning on said output signal of said logic decision gate in order to shape the pulse of said output signal in order to compensate for distortion in each of said opto-electric transducers when converting between optical and electrical signal.

6. The method according claim 3, wherein the signal conditioning adapts the pulse shape of the output signal of the decision gate to the pulse shape of input signals to said transducers. --

IN THE ABSTRACT:

Please add an Abstract of the Disclosure submitted herewith on a separate page.

REMARKS

Entry of the amendments to the specification, claims and abstract before examination of the application is respectfully requested.

If there are any questions regarding this Preliminary Amendment or this application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and

shortages in other fees, be charged, or any overpayment in fees be credited, to the Account of Evenson, McKeown, Edwards & Lenahan, P.L.L.C., Deposit Account No. 05-1323 (Docket #951/49164).

Respectfully submitted,

September 11, 2000

Vincent J. Sunderdick
Registration No. 29,004

EVENSON, McKEOWN, EDWARDS
& LENAHAN
1200 G Street, N.W., Suite 700
Washington, DC 20005
Telephone No.: (202) 628-8800
Facsimile No.: (202) 628-8844

VJS/rrt

--**ABSTRACT OF THE DISCLOSURE**

A data bus arrangement and method for connecting a plurality of nodes to one another through a star coupler arrangement of a data bus which uses a logical decision gate having a plurality of inputs corresponding to said plurality of nodes wherein the logical decision gate inputs receive electrical signals and outputs an electrical signal to be routed back to each of said plurality of nodes. Some of the nodes are connected through opto-electric transducers to the inputs of the logical decision gate. These transducers convert optical input signals from the nodes to electric signals to the inputs of the logical decision gate and also convert the output from the logical decision gate back to optical signals to the nodes. A signal conditioning circuit modifies the output signal of the logical decision gate in a pulse shaping manner in order to compensate for distortion caused by optical to electrical and electric to optical conversions occurring within the opto-electronic ransducers.--

09/623897

English Translation
PCT/EP99/01172
533 Rec'd PCT/PTO 11 SEP 2000

Data Bus for a Plurality of Nodes

The invention relates to a data bus for a plurality of nodes which exchange data messages among one another via at least one electrical line. The line may be a component of a star coupler. Such a data bus is known from the previously unpublished German patent application 19720401. With regard to the circuitry structure of the data bus, this document does not contain any concrete information.

The circuitry of such a data bus may be implemented in the form of an open collector circuit. An open collector circuit has the disadvantage that, at high transmission rates and with many bus nodes, a relatively low resistance must be used as the collector resistance in order to obtain sufficient edge steepness of the signal messages which are present in pulse form. This leads to high currents and the necessity of using power transistors and resistors as well as to high power dissipation.

A further problem results if at least one part of the nodes supplies optical messages. Particularly if the number of bus nodes is large, signal amplification is required to supply the messages in an adequate quality to all nodes. For this purpose it is suitable to convert the messages into electrical form, to amplify them and to reconvert them into optical form. However, this double conversion with additional signal amplification, however, causes signal distortions that reduce data bus efficiency.

For a data bus designed as an open collector circuit, it is known in the art to provide signal shaping devices (cf. US 5,684,831 A). Such a device is provided for each node. This results in high circuit complexity, particularly if there are many nodes.

The object of the invention is to create a data bus of the initially mentioned type, which provides interference-free bus communication with low circuit complexity even if the number of optical bus nodes is large.

The invention attains this object by means of the features of Claim 1.

The invention essentially consists of the logic decision gate and the signal conditioning circuit and their interaction. The decision gate does not require complex signal shaping devices for its use. It transmits the signals in their unchanged form. Moreover, the power requirement is low even if the number of nodes is large. The logic decision gate also makes it possible drastically to reduce the circuit complexity. It is only necessary to arrange a single signal conditioning circuit which models the output signal of the decision gate with regard to the pulse shape between the decision gate and the inputs of the nodes.

This can consist of matching the shape of the output signal to the shape of the input signal or of an adaptation as described in US 5,684,831 A. The rising edges are flattened to make it possible to distinguish the useful signals from high-frequency noise signals with extreme edge steepness.

Embodiments of the invention are possible both with nodes that supply electrical data messages as well as with nodes that generate optical data messages. The latter nodes are connected to the data bus via opto-electric transducers in such a way that the signal outputs of the nodes are each routed to the decision gate via a transducer of this type, and the output of the decision gate is routed to the inputs of the nodes via a common electro-optical transducer or via individual transducers of this type.

The invention will now be explained in more detail by means of the drawing in which

Fig. 1 schematically shows the structure of a data bus according to the invention, which achieves reliable bus communication for a plurality of bus nodes with little circuit complexity, and

Fig. 2 is a further embodiment of the invention.

A data bus of which a detail is shown in Figures 1 and 2 serves to connect nodes to one another which supply optical messages. The messages of the nodes (for reasons of clarity, Fig. 1 shows two nodes T_n and T_{n+1}) are routed as input signals to the inputs of opto-electronic signal transducers S/E_n and S/E_{n+1}. The electrical output signals (Di_n, Di_{n+1}) of these transducers are linked to an AND gate 1. The number of inputs and outputs of the gate corresponds to the number of the bus nodes. The output 2 of the AND gate 1 drives all the inputs (Do_n, Do_{n+1}) of the transducers S/E_n and S/E_{n+1}. The latter supply pulse-shaped optical output signals, which deliver these messages to the nodes via optical transmission segments (not shown).

In this manner, each node receives all the messages sent by the other nodes as well as its own message in return.

As mentioned above, the AND gate 1 has a substantially lower power requirement than the initially mentioned open collector circuit.

Also shown is the use of a signal conditioning device SA on the output of the AND gate 1. During the conversion of an electrical signal into an optical signal, pulse distortion occurs. This is caused, for example, by the fact that threshold tracking of an optical receiver cannot occur in an infinitely short time, or by nonlinearities of the characteristics of optical components.

In the system shown, pulse distortions on the order of 15 - 20 ns are expected per optical transmission segment with one opto-electric respectively electro-optic transducer each. Since the nodes are connected via two transmission segments each, this pulse distortion adds up to 30 - 40 ns in the worst case. For a target data rate of 10 Mbit/s and, for example, NRZ (non-return-to-zero) coding, the bit time is 100 ns. Due to the pulse distortion, a bit can "shrink" to a duration of 60 - 70 ns. The distortion adds up to 30% of the signal length. As a result, a complex sampling process with at least 8 times sampling must be used, which is furthermore sensitive to crystal jitter.

Through the use of signal conditioning SA at the output of the AND gate in the star coupler, it is achieved that the NRZ coded signals are returned into a 100 ns bit time form without pulse distortion. This makes it possible, for example, to

eliminate signal shape distortions, such as may be generated by opto-electric transducers (S/En, S/En+1).

For signal conditioning in the SA device, it is possible to use, for example, the same sampling method as that employed for the individual nodes. It is also possible to use a special signal conditioning process that takes into account special boundary conditions in the data bus.

As a result, data transmission becomes substantially more robust. Short glitches can be filtered out. The sampling method requirements in the individual nodes can be set lower or the tolerance to pulse distortions on a transmission segment increases. The sampling method is clearly less susceptible to crystal jitter. With identical robustness, lower frequency crystals can be used, which provides cost advantages.

Data Bus for a Plurality of Nodes

Claims

1. Data bus for a plurality of nodes which are connected to one another via a star coupler, characterized in that
the input signals of the star coupler are in electrical form, that the star coupler comprises a logic decision gate, to the inputs of which the outputs of the nodes are connected and to which the input signals are routed, that the output of the decision gate is connected in parallel manner to the inputs of the nodes via an electrical line, that at least one part of the nodes is connected to the star coupler via an optical transmission segment with opto-electric transducers connected on the load side or the line side, and that a signal conditioning circuit which models the output signal with regard to the pulse shape is arranged between the decision gate and the inputs of the nodes.

2. Data bus as claimed in Claim 1, characterized in that the signal conditioning circuit adapts the output signal of the decision gate with regard to the pulse shape to the pulse shape of the input signals.

FIG.1

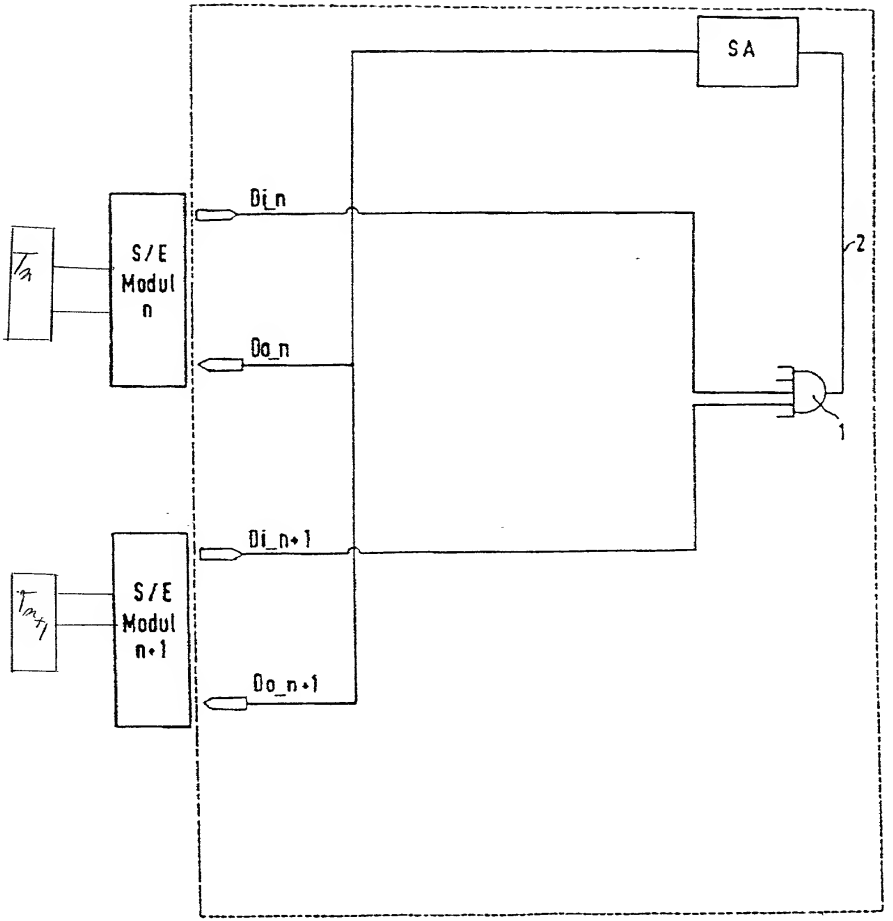
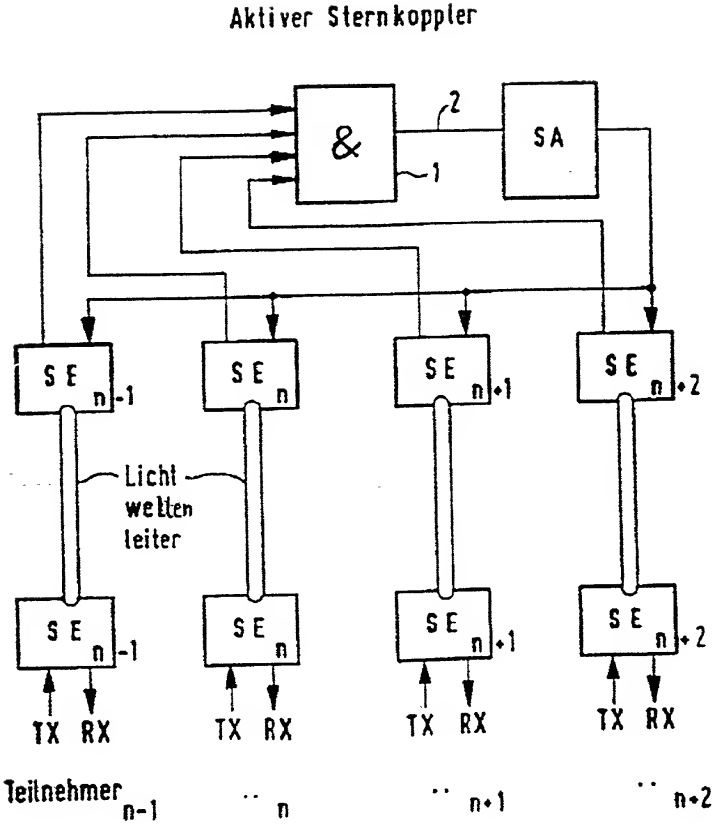


FIG.2


Aktiver Sternkoppler
&
2
1
SA
SE n-1
SE n
SE n+1
SE n+2
Licht wellen leiter
SE n-1
SE n
SE n+1
SE n+2
TX RX
TX RX
TX RX
TX RX
Teilnehmer n-1
n
n+1
n+2

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER

951/49164

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Data Bus For A Plurality of Nodes

the specification of which (check only one item below):

[ ] is attached hereto.

[ ] was filed as United States application
Serial No. _____
on _____
and was amended
on _____ (if applicable).

[X] was filed as PCT international application
Number PCT/EP99/01172
on October 3, 1998
and was amended under PCT Article 19
on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations. §1.56(a).

I hereby claim foreign priority benefits under Title 35, United State Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT indicate PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
Germany	198 10 288.7	10 March 1998	[X] Yes [ ] No
			[ ] Yes [ ] No
			[ ] Yes [ ] No
			[ ] Yes [ ] No
			[ ] Yes [ ] No

Combined Declaration For Patent Application and Power of Attorney (Continued) (includes Reference to PCT international Applications	ATTORNEY'S DOCKET NUMBER 951/49164

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national of PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS *(Check one)*		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (IF ANY)			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Martin Fleit, Reg. No. 16,900; Herbert I. Cantor, Reg. No. 24,392; James F. McKeown, Reg. No. 25,406; Donald D. Evenson, Reg. No. 26,160; Joseph D. Evans, Reg. No. 26,269; Gary R. Edwards, Reg. No. 31,824; Jeffrey D. Sanok, Reg. No. 32,169; and Richard R. Diefendorf, Reg. No. 32,390

Send Correspondence to:	Direct Telephone Calls to: *(name and telephone number)*
Evenson, McKeown, Edwards & Lenahan, P.L.L.C. 1200 G Street, N.W., Suite 700 Washington, D.C. 20005	(202) 628-8800

201	FULL NAME OF INVENTOR	FAMILY NAME **PELLER**	FIRST GIVEN NAME **Martin**	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY Muenchen	STATE OR FOREIGN COUNTRY DEX	COUNTRY OF CITIZENSHIP Germany
	POST OFFICE ADDRESS	POST OFFICE ADDRESS Adelheidstr. 38	CITY Muenchen	STATE & ZIP CODE/COUNTRY D-80796, Germany
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
203	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true: and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
Martin Peller		
DATE 08/28/2000	Date	DATE